138. Proposed by HARRY S. VANDIVER, Bala, Pa.

Show that the number of solutions in positive integers for x, y, and z of $x^3+2y^3+4z^3-6xyz=1$ is infinite.

*** Solutions of these problems should be sent to J. M. Colaw not later than July 10.

GEOMETRY.

166. Proposed by S. F. NORRIS, Professor of Astronomy and Mathematics, Baltimore City College, Baltimore, Md.

Two cities are 200 miles apart. To what height must a man ascend from one city in order that he may see the other, supposing the circumference of the earth to bo 25,000 miles? [From Wentworth's *New Plane and Solid Geometry*, page 381, No. 619.] Required solution by Geometry.

167. Proposed by JOHN J. QUINN, Professor of Mathematics, High School, Warren, Pa.

If at the vertex of an isosceles triangle one of whose basal vertices is pivoted and the other free to move in a straight line. a rhombus be pivoted with sides parallel to the sides of the triangle, the locus of every point on the rhombus except the one which is its intersection with the fixed side of the triangle is an ellipse.

168. Proposed by MISS GUBELMAN, Student Southern Illinois State University, Carbondale, Ill.

To draw a perpendicular to one side of a triangle dividing it into two equivalent parts.

*** Solutions of these problems should be sent to B. F. Finkel not later than July 10.

CALCULUS.

130. Proposed by J. SCHEFFER, A. M., Hagerstown, Md.

Solve the differential equation $x^x(\frac{dy}{dx}+y\log x)-a=0$.

131. Proposed by F. P. MATZ, M. Sc., Ph. D., Professor of Mathematics and Astronomy, Irving College Mechanicsburg, Pa.

Integrate $2/x$, with regard to $d[\sqrt{(1-x^2)}]$.

132. Proposed by JOHN M. COLAW, A. M., Monterey, Va.

What expression derived from the *polar* equation of a curve is equivalent to the expression for dy/dx derived from the *Cartesian* equation of the same curve? Prove work with $\rho=2r\cos\theta$.

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MECHANICS.

122. Proposed by B. F. FINKEL, A. M., M. Sc., Professor of Mathematics and Physics, Drury College, Springfield, Mo.

Prove that a pressure P applied uniformly to a solid in all directions will reduce its dimensions along three perpendicular axes in ratio $1:1+p-2q$, p being the elongation along one face and q the contraction along the other. [Barker's *Physics*.]

123. Proposed by W. J. GREENSTREET, M. A., Editor of The Mathematical Gazette, Stroud, Gloucestershire, England.

Two equal uniform rods AB, BC are freely hinged at B; C rests on a rough horizontal plane, and A is attached to a point above it. When C is as far as possible from A for equilibrium, AB, BC make angles α, β. respectively, with the vertical. Find the coefficient of friction between the rod at C and the plane.

*** Solutions of these problems should be sent to B. F. Finkel not later than July 10.

AVERAGE AND PROBABILITY.

107. Proposed by L. C. WALKER, Assistant Professor of Mathematics. Leland Stanford Jr. University, Palo Alto, Cal.

Two points are taken at random in the curved surface of a hemisphere. Show (1) that the average length of the straight therein is $\frac{32r}{9\pi}$; and (2) that the average length of the arc of a great circle, which joins them, is $\frac{4r}{\pi}$.

108. Proposed by A. H. HOLMES, Brunswick. Me.

Required the average area of the quadrilateral whose sides are a, b, c, and d.

109. Proposed by G. B. M. ZERR, A. M., Ph. D., Professor of Chemistry and Physics, The Temple College, Philadelphia, Pa.

A cylinder pierces a sphere in such a manner that the cylinder is tangent internally to the projection of the sphere in the plane xy. Find (1) the average surface, (2) the average volume of the sphere included within the cylinder.

*** Solutions of these problems should be sent to B. F. Finkel not later than July 10.

MISCELLANEOUS.

108. Proposed by G. B. M. ZERR, A. M., Ph. D., Professor of Chemistry and Physics, The Temple College, Philadelphia, Pa.

To divide the arc of a cardioid into eight equal parts.

109. Proposed by J. SCHEFFER, A. M., Hagerstown, Md.

Find the latitude of the place where the sun's centre remains above the horizon for a hundred successive days.

In problem 105, Miscellaneous, April Number, Vol. VIII, No. 4,

$$\frac{2x}{a}=\frac{c}{a}l^{y/a}+\frac{a}{c}l^{-y/a} \text{ should be } \frac{2x}{a}=\frac{c}{a}e^{y/a}+\frac{a}{c}e^{-y/a}.$$

*** Solutions of these problems should be sent to J. M. Colaw not later than July 10.